(14), the reference beam is formed from the delivered reference coherent light and is directed onto the surface of the recording medium (15). The reference and the object beams interfere on the surface of recording medium (15) and form a hologram of the investigation area of the object. This hologram is registered and developed by the recording medium (15).

IN THE CLAIMS

Please amend the following claims.

1. (Amended) A method for performing measurements of residual stresses in an investigation area of an object by use of optical holographic interferometry technique, in which the device used to perform the measurement includes:

a coherent light source and a registering medium arranged in a environment at a distance from the object which is to be investigated;

a first single-mode light guidance cable that transmits the coherent light from the light source to the investigation area of the object that is to be investigated in such a manner that it illuminates the investigation area;

a second single-mode light guidance cable that transmits the coherent object light, which scatters off the investigation area of the object which is to be investigated from the investigation area to the registering medium in such a manner that it illuminates the registering medium; and

a stress relieve device that induces a release of the residual stresses at the object in situ while the formation, registration and development of the holographic image and formation of the interferogram of the investigation area of the object are performed in said environment, the method comprising:

registering and developing a hologram of the investigation area of the object on a registering medium;

subjecting a small region of the investigation area of the object to a release of the residual stress; and

forming an interferogram of the investigation area of the object by simultaneously illuminating the registering medium containing the developed holographic image of the investigation area of the object in the initial state and the investigation area of the object containing the region of released residual stresses with the reference and object beams, respectively, wherein the interferogram is formed as a result of interference between the two light waves which corresponds to the light waves scattered off the investigation area of the object before and after release of the residual stresses.

2. (Amended) The method according to claim 1, further comprising transmitting the coherent light between the object, light source, and holographic camera in single-mode light guidance cables, wherein the endpoints of the single-mode light guidance cables are securely attached in a

fixed distance of the investigation area of the object and the recording medium thereby protecting the formation of the holographic image and interferogram of the investigation area from mutual relative displacements of the object, holographic camera and the light source.

3. (Twice Amended) The method according to claim 1, wherein the step of subjecting the small region of the investigation area of the object to the non-destructive dislocation release of the residual stress includes exposing the investigation area of the object to a electric current pulse.

4. (Twice Amended) The method according to claim 1, wherein the step of registering and developing the hologram image and the step of forming the interferogram of the investigation area are performed in an environment suited for an operation of amorphous molecular semiconductors.

5. (Amended) A device for measurements of residual stresses of an object by optical holographic interferometry technique comprising:

a source of coherent light;

a holographic interferometer;

a recording medium;

a device for reslease of residual stresses; and

auxiliary devices for observing and processing of an interferogram, wherein the holographic interferometer is divided into a holographic probe comprising means for illuminating the investigation area of the object by coherent light, collecting the coherent light that scatters off the investigation area and means for performing a release of the residual stresses in a small region of the investigation area, and a holographic camera comprising means for formation, registration, and development of a hologram and for formation of an interferogram of the investigation area of the object, and

wherein the coherent light is transmitted from the light source to the probe by a first single-mode light guidance cable, from the holographic probe to the holographic camera by a third single-mode light guidance cable, and the reference coherent light transmitted from the light source to the holographic camera by a second single-mode light guidance cable.

6. (Amended) A device according to claim 5, wherein the holographic probe comprises a spacer portion, first and second rigidly connected probe optical connectors and an electric current supply electrode with means for putting the electric current supply electrode into junction with the investigation area of object, where the first probe optical connector is connected to the first single-mode light guidance cable, the second probe optical connector is connected to the third single-mode light guidance cable, and where the electric

current supply electrode is connected to a generator of the electric pulses by means of electric cables.

7. (Amended) The device according to claim 6, wherein the holographic probe has a narrow cylindrical shape in order to make the probe suitable for use in difficult to access places and for curved surfaces of the investigation area.

8. (Twice Amended) The device according to claim 6, wherein the holographic camera comprises first and second camera optical connectors and a recording medium which are rigidly connected and arranged at fixed distances relative to each other, where the first camera optical connector is connected to the second single-mode light guidance cable, and the second camera optical connector is connected to the third single-mode light guidance cable.

9. (Amended) The device according to claim 8, wherein the first and second single-mode light guidance cables are connected to the source of coherent light via a splitter of coherent light.

Please add the following claims:

--10. (NEW) A device for performing non-destructive real-time measurements of residual stresses of an object, comprising:

a control unit, wherein the control unit is configured to generate coherent light and split the coherent light into a reference beam and an object beam;

a probe connected to the control unit by a first light guidance cable, wherein the probe is configured to receive the object beam from the control unit, illuminate an investigation area of an object with the object beam, collect a reflected object beam from the investigation area, and induce a release of the residual stresses in the investigation area; and

a holographic camera connected to the control unit by a second light guidance cable and connected to the probe by a third light guidance cable, wherein the holographic camera is arranged to receive the reference beam from the control unit, receive the reflected object beam from the probe, generate a hologram based on the reference beam and the reflected object beam, and generate an interferogram of the investigation area where in the probe is movable with respect to the control unit.

11. (NEW) The device of claim 10, wherein lengths of the first, second, and third light guidance cables are such that the cables ensure a fixed optical distance between the investigation area and the holographic camera.

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12. (NEW) The device of claim 10, wherein the control unit comprises:

a coherent light source configured to generate the coherent light; and

a beam splitter configured to split the coherent light from the coherent light source to generate the reference and object beams, wherein the object beam is transmitted through the first light guidance cable and the reference beam is transmitted through the second light guidance cable.

13. (NEW) The device of claim 10, wherein the probe comprises:

a probe object beam connector arranged to illuminate the investigation area with the probe object beam transmitted through the first light guidance cable;

a probe reflection beam connector configured to collect the reflected object beam from the investigation area and transmit the reflected object beam through the third light guidance cable; and

a stress releaver arranged to induce the release of the residual stresses in the investigation area.

14. (NEW) The device of claim 13, wherein relative positions of the probe object beam connector and the probe reflection beam connector are fixed.

15. (NEW) The device of claim 14, wherein the probe further includes a spacer portion such that one or both of the probe object beam connector and the probe reflection beam connector are placed a fixed distance from the investigation area.

16. (NEW) The device of claim 13, wherein the stress releaver is arranged to apply an electric current pulse to the investigation area.

17. (NEW) The device of claim 10, wherein the holographic camera includes:

a camera reference beam connector arranged to project the reference beam transmitted through the second light guidance cable on to a recording medium; and

a camera reflection beam connector arranged to project the reflected object beam transmitted through the third light guidance cable on to the recording medium.

18. (NEW) The device of claim 17, wherein relative positions of the camera reference beam connector, the camera reflection beam connector, and the recording medium are fixed.

19. (NEW) The device of claim 10, wherein the first, second, and third light guidance cables are single-mode light guidance cables.

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20. (NEW) A method to perform measurements of residual stresses of an object, comprising:

forming an initial hologram of an investigative area of an object using a device that includes a control unit, a probe connected to the control unit by a first light guidance cable, and a holographic camera connected to the control unit by a second light guidance cable and connected to the probe by a third light guidance cable;

inducing a release of the residual stresses in the investigation area using the device; and

forming an interferogram of the investigation area using the device.

21. (NEW) The method of claim 20, wherein the step of forming the initial hologram of an investigative area of an object includes:

generating coherent light;

splitting the coherent light into a reference beam and an object beam;

illuminating the investigation area with the object beam transmitted through the first light guidance cable;

collecting a reflected object beam from the investigation area; and

projecting the reference beam transmitted through the second light guidance cable and the reflected object beam transmitted through the third light guidance cable to a recording medium.

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22. (NEW) The method of claim 21, wherein the step of inducing the non-destructive dislocation release of the residual stresses in the investigation area includes applying an electric current pulse to the investigation area.

23. (NEW) The method of claim 22, wherein the step of forming the interferogram of the investigation area includes performing the following steps after inducing the release of the residual stresses in the investigation area:

illuminating the investigation area with the object beam transmitted through the first light guidance cable;

collecting a reflected object beam from the investigation area;

projecting the reference beam transmitted through the second light guidance cable and the reflected object beam transmitted through the third light guidance cable to the recording medium; and

interposing the projected image with the initial hologram.

24. (NEW) A device for performing measurements of residual stresses of an object, comprising:

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controlling means including means for generating coherent light and means for splitting the coherent light into a reference beam and an object beam;

probing means including means for receiving the object beam from the controlling means, means for illuminating an investigation area of an object with the object beam, means for collecting a reflected object beam from the investigation area, and means for inducing a release of the residual stresses in the investigation area; and

holographing means including means for receiving the reference beam from the controlling means, means for receiving the reflected object beam from the probing means, means for generating a hologram based on the reference beam and the reflected object beam, and means for generating an interferogram of the investigation area;

wherein the controlling means, the probing means, and the holographing means are connected to allow the probing means to move freely with respect to the controlling means.

25. (NEW) A device of claim 24, wherein the device includes first, second, and third light guidance cables such that the first light guidance cable connects the controlling means and the probing means, the second light guidance cable connects the probing means and the holographing means, and the third light guidance cable connects the controlling means and holographing means.

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26. (NEW) The device of claim 24, wherein relative positions of the means for illuminating and the means for collecting are fixed.

27. (NEW) The device of claim 24, wherein the means for inducing includes means for applying an electric current pulse to the investigation area.

28. (NEW) The device of claim 24, wherein the means for generating the hologram includes:

means for recording;

means for projecting the reference beam to the means for recording; and

means for projecting the reflected objected beam to the means for recording.